

US EPA ARCHIVE DOCUMENT

# **Pollution Prevention and Water Reuse Considerations In DOC Operations**

**Department of Corrections Environmental  
Compliance Workshop**

**May 12, 2009**

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# Pollution Prevention

- It's really about "Sustainability"
- Keep production possible by keeping it efficient
- Wise use of resources



# **ALDOC's production is diverse...examples:**

- Catfish farming
- Woman's clothing
- Auto body repair
- Metal fabrication (Tag Plant)
- Cattle farming
- Furniture manufacturing
- Printing and graphics
- Hospital services



# Look at the manufacturing Side...

- As much as possible, follow the principles of Six Sigma and Lean Manufacturing...

- Sigma (the lower-case Greek letter  $\sigma$ ) – represents the standard deviation (one measure of variation) of a statistical amount
- Six Sigma: After six standard deviations, production is nearly perfect!

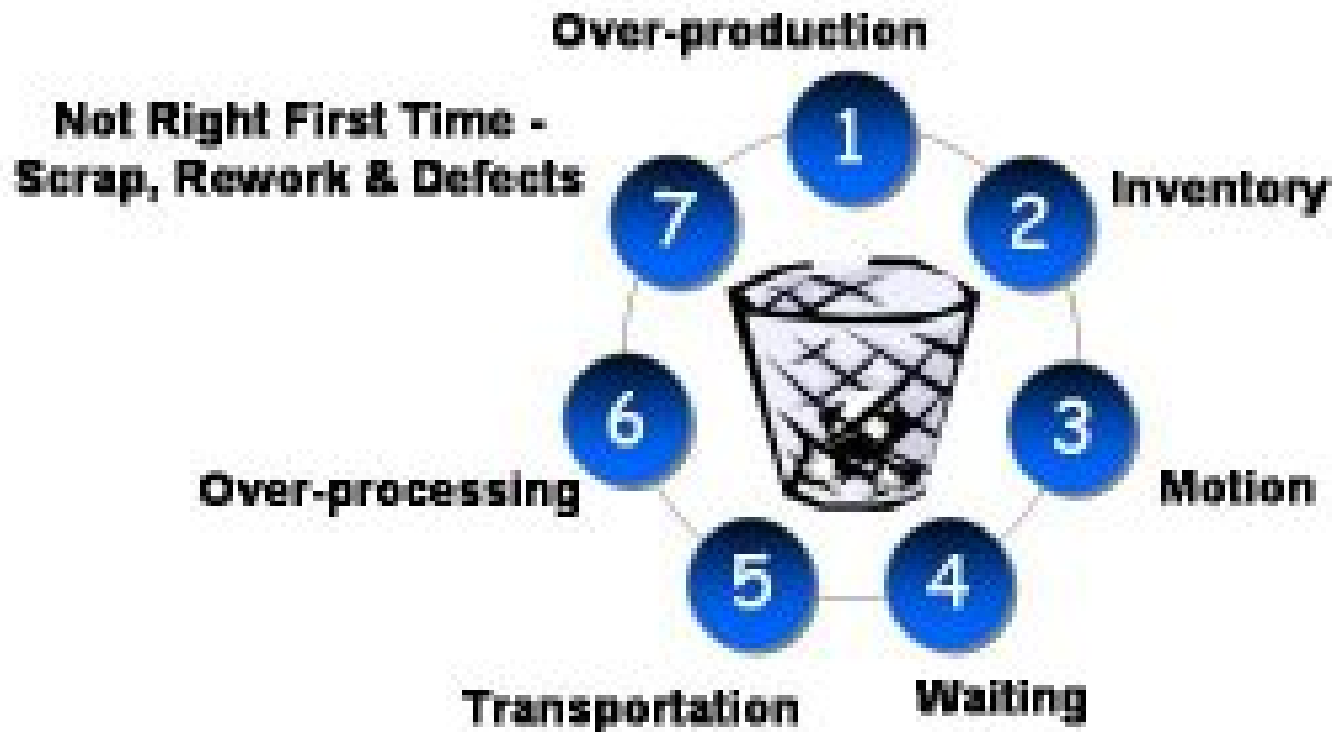
## What Is Lean Manufacturing?

- A management process of doing More with Less
- Toyota exemplifies the success of the process

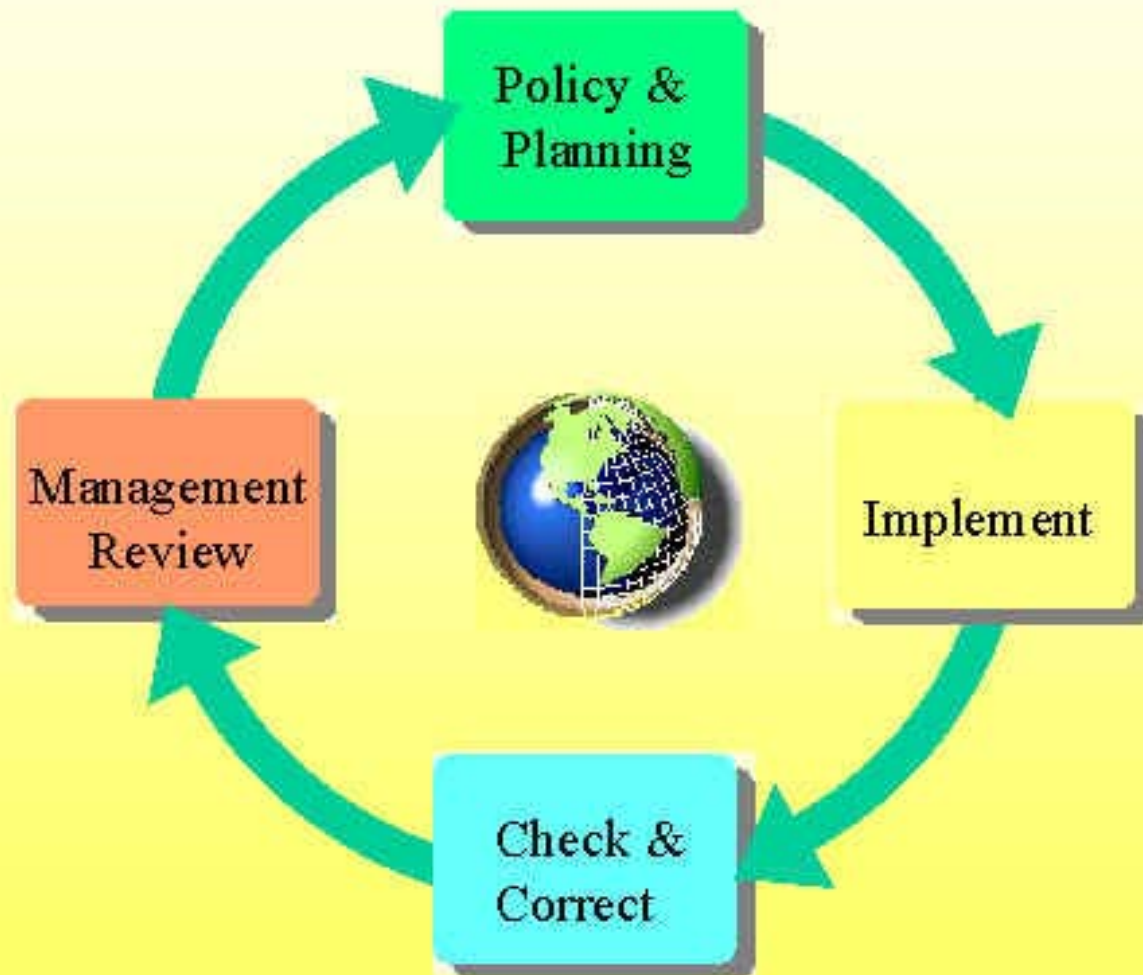
- The Old Cycle...
- Plan -- Do – Check !!
- Except it targets resources a little more:
  - Toyota's Lean Mfg Waste Principle



# The 7 Wastes



# ISO 14001: A Model for Continuous Improvement





# Where is the waste?

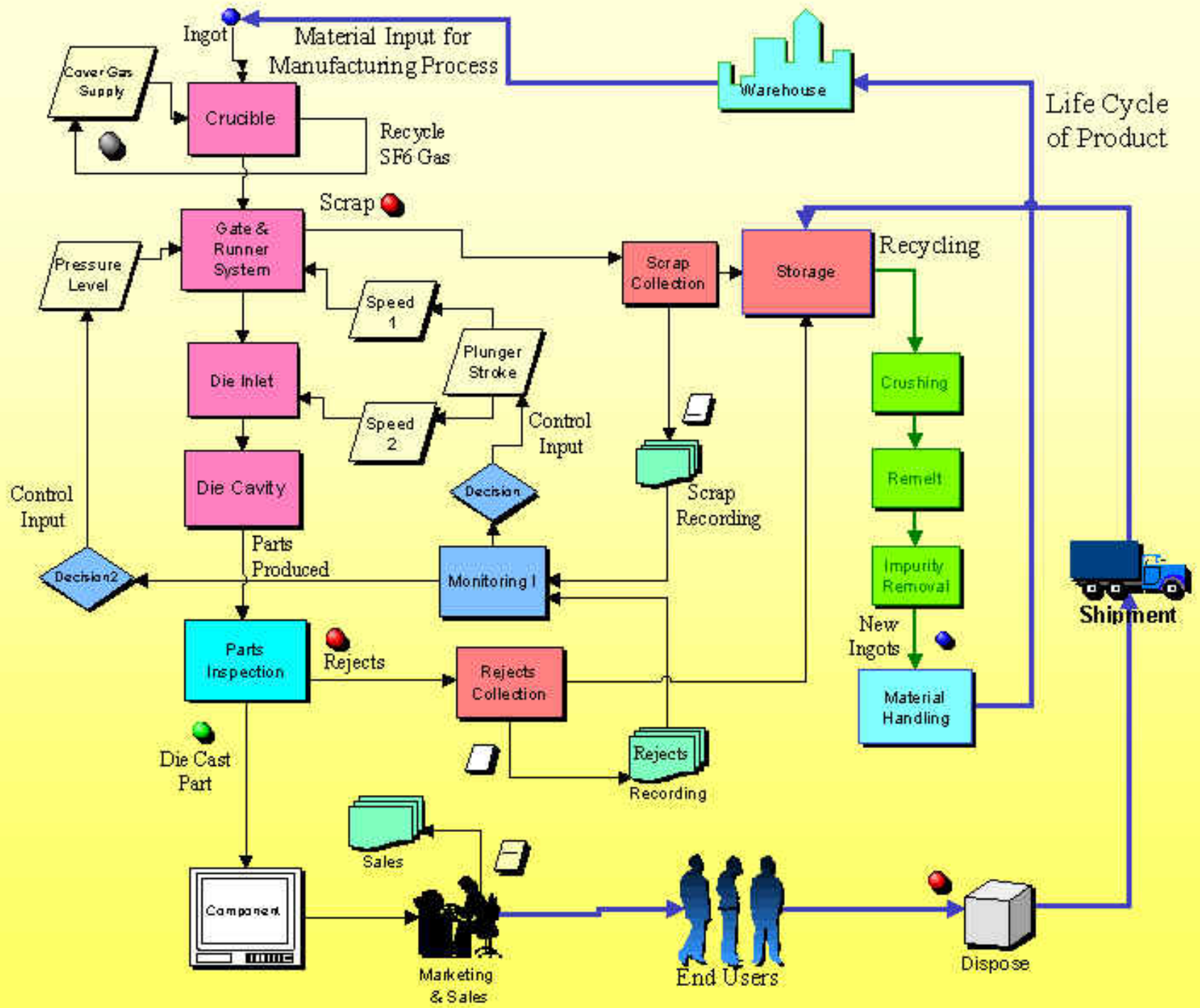
- Of natural resources
- Of People
- Of out –of-spec product generated

???



# Benchmark Your Processes

- Develop a detailed Process Flow Diagram
- Identify energy uses, raw material usage, key production areas, and efficiency points





# Be prepared to measure success

- Know your baseline starting point...

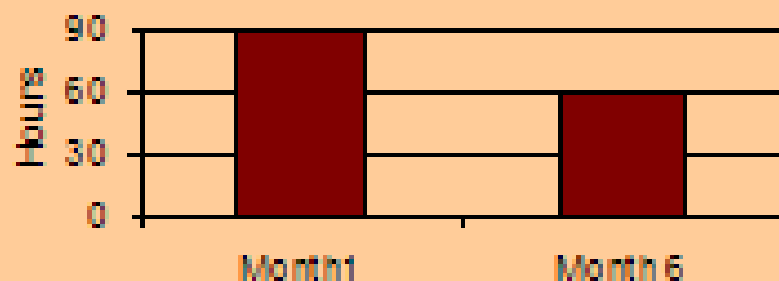


# Lean Manufacturing: SME Case Studies

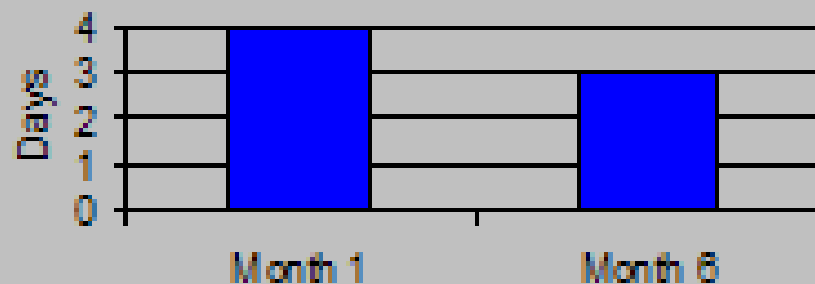
## Gold Seal Engineering Products Ltd. (India)

manufacturer of plastic & rubber components; 160 employees in 3 plants

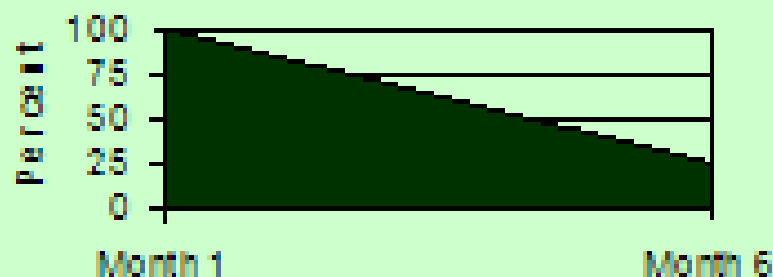
### Production Set-Up Time



### Lead Time



### Scrap Reduction



### Benefits within the first 6 months:

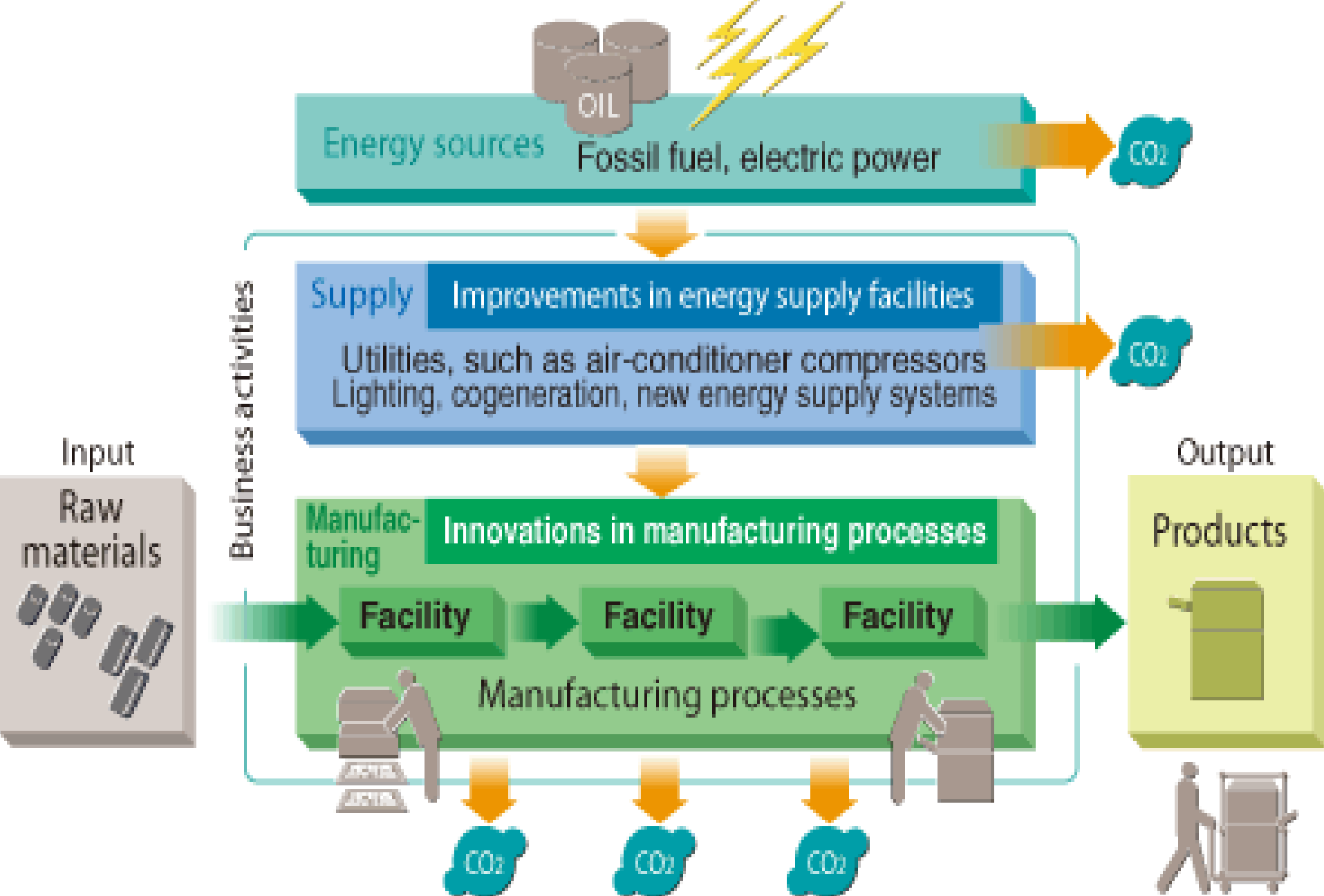
- 25% lead time reduction
- 45% production space increase
- 75% scrap reduction
- 60% machine down time reduction
- 42% response time reduction



# Be Prepared...

- To Be Innovative...







## Part 2 – Water Reuse

- This could be implemented in the near future at ALDOC facilities



- 2006 & 2007 – Record Drought Conditions in Alabama
- All of the state under drought in 2007
- Parts of state were in “extreme” or “severe” drought.



# Is the Drought Over?

- It's really too early to tell
- We need several years of nominal rainfall to call the recovery complete
- Groundwater levels will take several years to return to normal



**AVOID CONTACT WITH  
THE STREAM WATER  
QUALITY BEING MONITORED  
FOR RAW SEWAGE**

**MAY 24 2007**



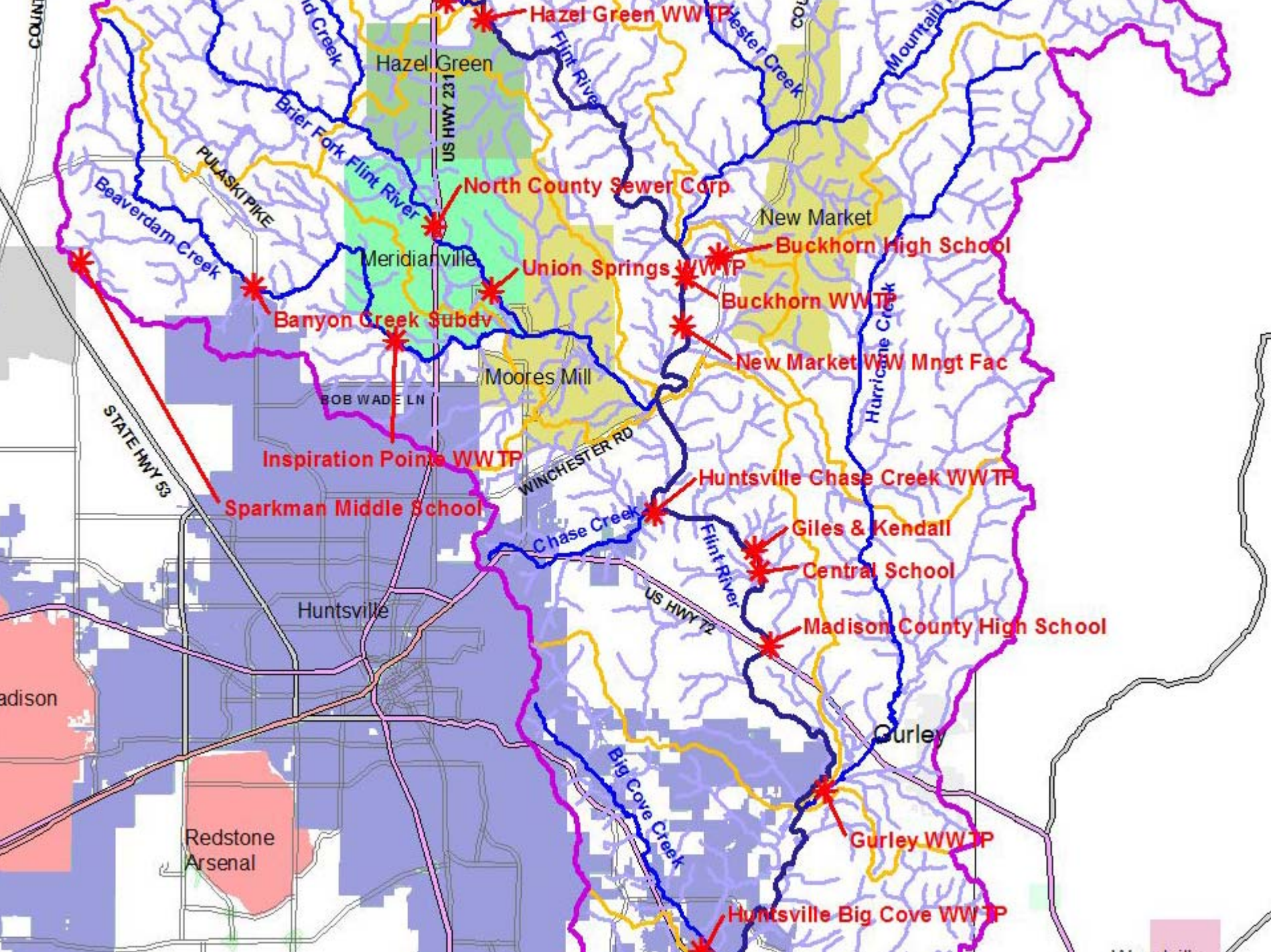
## The Permit “Driver”

- Obtaining an NPDES Permit is becoming more difficult:
  - Stream assimilative capacities diminished
  - Many streams may have designated ‘impairments’
  - TMDLs now often lead to very strict discharge limits that are not cost effective to achieve

- *The race for stream “allocations”*
- One earlier permitted wastewater discharge can “Trump” another

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# The Green Initiative Driver

- Developers, industries and municipalities want to be associated with a positive, innovative environmental project



# The Technology Driver

- State of the art wastewater treatment technologies are available AND, the technologies are becoming truly cost effective



# The Energy Conservation Component...

- Why treat a raw water source to high quality supply when I'm just going to use it for clean-up or commode use?



# Municipal Water Availability Driver

- The water you need just ain't available...
- Mainly drought related
- Also a function of rapid development in certain areas of the state
- Often a lack of available groundwater capacity



# **AKA – The creative thinking driver!**

Let's take water from the stream!

Let's sell our treated wastewater...





# Federal Regulations...

- There are no federal regulations governing water reclamation & reuse





# State Regulations

- 40 states with regulations allowing reuse of domestic wastewater on non-food crops
- 34 states with regulations allowing restricted urban reuse (e.g., golf courses)
- 28 states with regulations allowing unrestricted urban reuse (e.g., parks, playgrounds, toilet flushing) of treated wastewater





# State Regulations Cont'd

- 21 states with regulations for the reuse of wastewater on food crops
- 9 states with regulations supporting reuse of wastewater for industrial purposes (e.g., cooling tower water)
- Only 3 states permitting the environmental reuse of wastewater to create wetlands or augment stream flows



# The State Numbers...

- ...are hard to gauge
  - Most of these activities can be done through NPDES Regulations...
  - But... for the future, we are talking TRUE water reuse regulations

- ...Allow Water Reuse
- But an NPDES discharge permit and a Water Reuse permit are very different



# Wastewater Permit Options

- National Pollutant Discharge Elimination System (NPDES) Permit
- Underground Injection Control (UIC) Permit
- Water Reuse Permit (Future Regulation)



# Who Gets An NPDES Permit?

- A 'Point Source Discharger'
- Discharging Pollutants to Waters of the State



Point Source Pollution





# NPDES Permits

- Goal is to generate a discharge of treated wastewater to a water of the state
- The discharge limits must be protective of the water use classification of the receiving stream



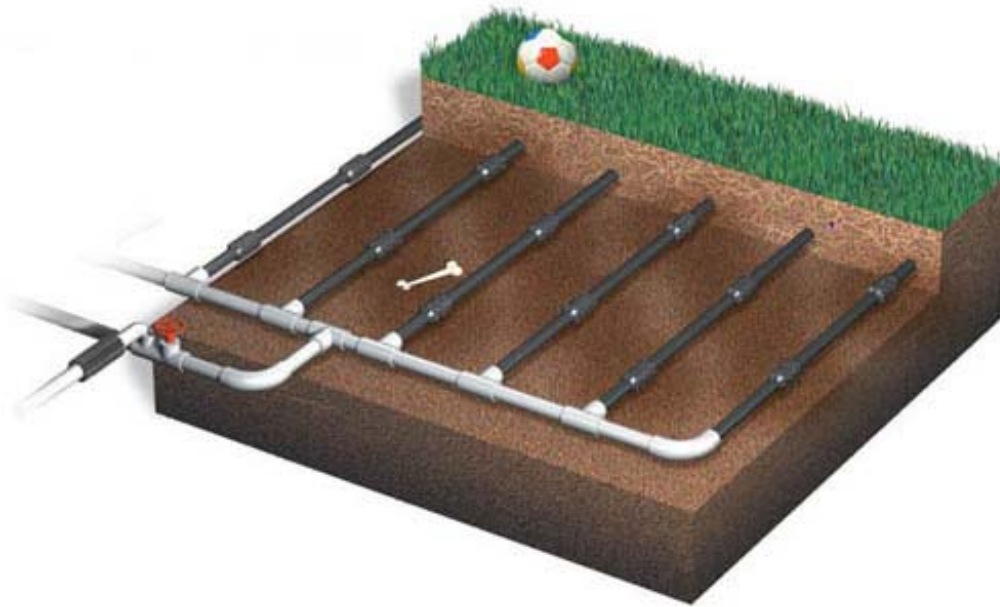
# NPDES Permits

- There are about 40 land application discharges permitted under the NPDES permit process
- Primarily spray irrigation
- Goal is to get rid of the water
- May or may not consider nutrient value
- General spray irrigation is NOT reuse



# Who Gets A UIC Permit?

- Cluster systems
- Decentralized systems
- Perc Ponds
- Discharge directly to the GW table





- **Drip through an underground line**
- **There is NO DISCHARGE to a surface water**
- **If dose properly, soil is never saturated**
- **Water must go up via capillary action, evapotranspiration**
- **No adverse impact to ground water**

- Limits imposed that are protective of GW
- Goal is still to get rid of the water generated



# Who Gets A Water Reuse Permit?

- A developer, municipality, or industry that wishes to produce... and either use or provide reclaimed water
- Committing to have NO surface discharge





# Water Reuse Permits

- Treated water is considered a resource
- Reclaimed water can be sold
- Permittee will be providing water for a number of “end uses” that require water of appropriate quality



# Conceivable Treatment Requirements for Water Reuse

- The following water reuse treatment requirements are presented only for discussion purposes
- No decisions have been made on the actual treatment levels to implement through the water reuse regulation



# Conceivable Treatment Requirements

## Tier 1 – "Restricted Use"

- CBOD = 25 mg/L  
(e.g., application to non-edible crops)
- TSS = 25 mg/L
- FC = 200 col/100 ml



# Conceivable Treatment Requirements

## Tier 2 – "Groundwater Recharge"

- CBOD = 25 mg/L
- TSS = 25 mg/L
- FC = 200 col/100 ml
- Nitrate-N = 12 mg/L



# Conceivable Treatment Requirements

## Tier 3 – “Unrestricted Use”

- CBOD = 10 mg/L  
(e.g., irrigation, application to edible crops, commode use)
- Turbidity = 10 NTU (continuous reading)
- FC = 25 max; 75 percent non-detect
- Setback = No requirement. But - no off site runoff or discharge to a surface water feature

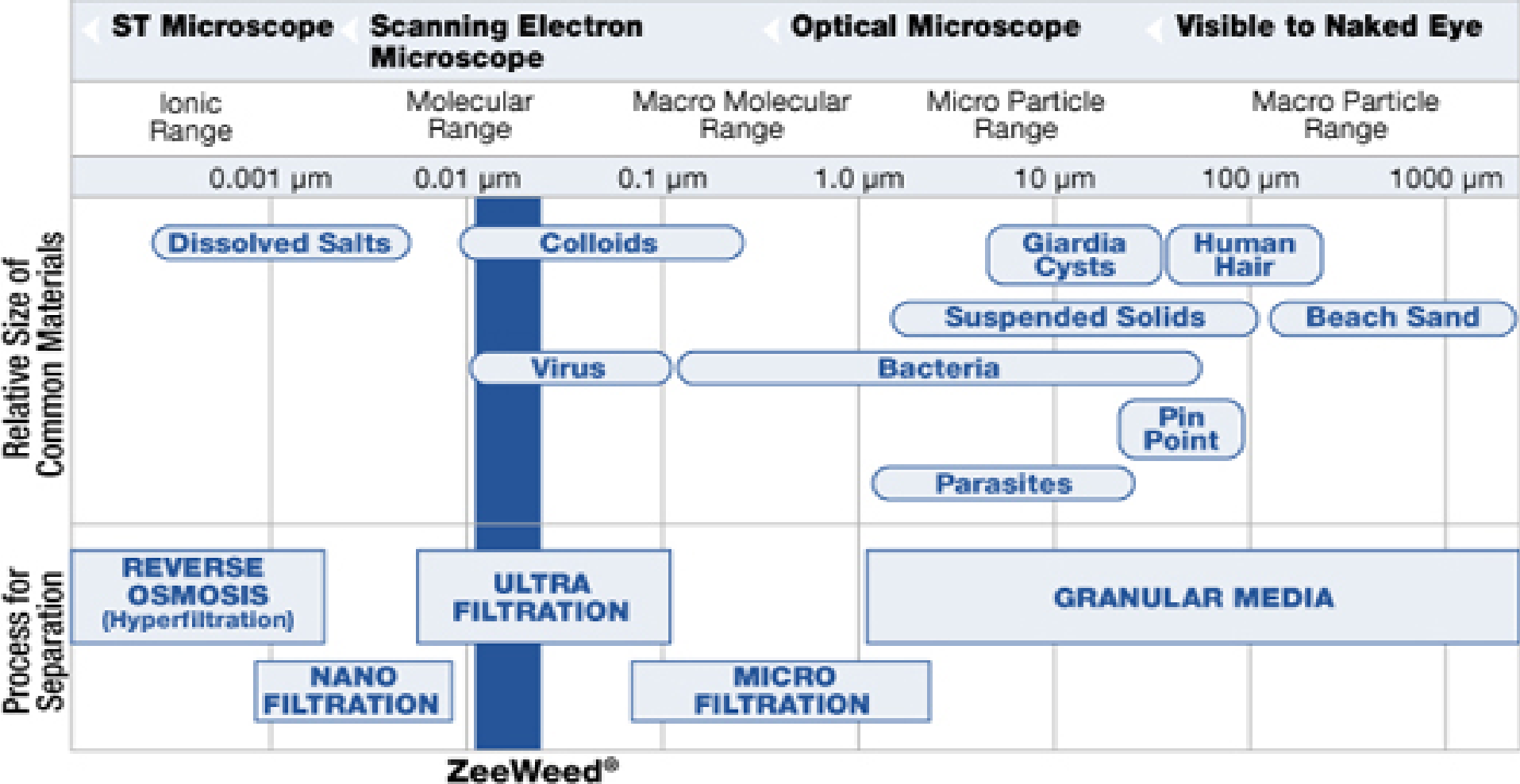


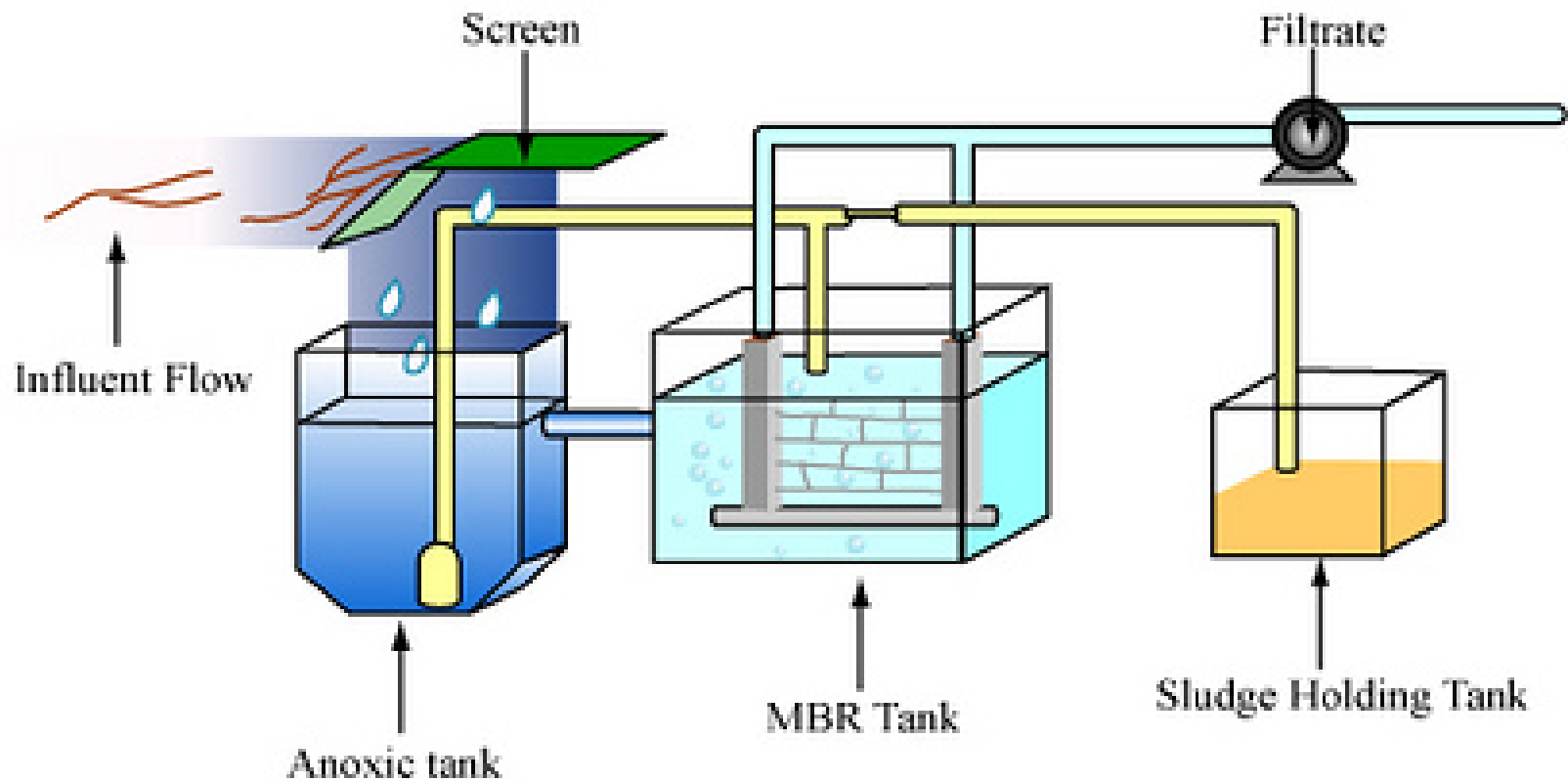


## To get to “Tier 3”...

- Whatever “Tier 3” may be...
  - *unrestricted use* limits will obviously be very low
- High level of biological and physical-chemical treatment will be required

- Membrane Biological Reactor
- Microfiltration
- Ultrafiltration (more an industrial application)
- Multi-Media Tertiary Filtration





**A Typical Membrane Biological Reactor with Denitrification**





# Model Treatment Plants in Alabama

- We have a few of WWTPs that are producing ReUse quality water in Alabama
- But they are presently doing this under an NPDES Permit













# Who Will Be First...

- Many stakeholders involved:
- Hudson (Urban Villages) Development (Montgomery)
  - Model community with integrated land use and land preservation
  - 1,300 acres of conserved open space serving local residents and beyond
  - Organic farm, water reuse, wetlands, constructed bogs, and other outdoor lifestyle amenities



# Benchmark Water Reuse Facilities

- Riviera Utilities – Pilot Program in Foley
- Natural Systems International – an “ecological engineering” firm with vast experience
- Integra Water
- Hatch Mott MacDonald



# Key Water Reuse Stakeholder Committee Members

- Pete Nunoz (Natural Systems International)  
[pete@natsys-inc.com](mailto:pete@natsys-inc.com)
- Richard Peterson (Riviera Utilities)  
[rpeterson@riviera-utilities.com](mailto:rpeterson@riviera-utilities.com)
- Anthony Hughes (Hatch Mott MacDonald)  
[anthony.hughes@hatchmott.com](mailto:anthony.hughes@hatchmott.com)
- Chad Adams (Urban Villages)  
[chad@urban-villages.com](mailto:chad@urban-villages.com)
- Wes Self (Integra Water)  
[ws@integrawater.com](mailto:ws@integrawater.com)



## In the end...

- We believe that we have plenty of water on hand over the long term
- But we need to implement new and creative tools to manage our water resources
- Water Reuse is one important tool



## Part 3 - SEP Bank

- “Supplemental Environmental Project”
- SEP = a beneficial environmental project that a violator agrees to undertake in the settlement of an enforcement action
- ADEM intends to expand the use of SEPs
- SEP Banks are a good way to implement pollution prevention and stream restoration projects

- ADEM is developing a list of specific projects that are included in a pre-approved SEP Bank
- SEP Bank Committee established to review the proposals
- Any person or group can propose a project

- We will initiate the SEP Bank in a matter of weeks



# Questions

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Compliance Assistance Program